

WHAT IS CLAIMED IS

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1. An image processing method for correcting image distortions caused by oblique imaging in which an original image of an object on an object plane is taken from different oblique directions to obtain a plurality of partially overlapping images, comprising the steps of:

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determining a feature point of one of the plurality of partially overlapping images corresponding to a common location of the original image, shared by the plurality of partially overlapping images, and determining a matched point of one of the other partially overlapping images corresponding to the feature point so that a direction of the object plane is calculated based on the feature point and the matched point;

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selecting one of the plurality of partially overlapping images as a standard image whose image distortions are to be corrected; and

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generating a distortion-corrected image on a projection plane by projecting the standard image onto the projection plane based on the direction of the object plane such that image distortions in the standard image are eliminated.

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2. The image processing method according to claim 1 wherein
in said selecting step, one of the plurality of partially overlapping
images is automatically selected as the standard based on a ratio of
an area of an object region to an entire area of each image.

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3. The image processing method according to claim 1 wherein
in said selecting step, one of the plurality of partially overlapping
images is automatically selected as the standard based on a direction
of a straight-line pattern contained in each image.

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4. The image processing method according to claim 1 wherein
in said selecting step, one of the plurality of partially overlapping
images is automatically selected as the standard based on the feature
point and the matched point determined by said determining step.

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5. The image processing method according to claim 1, wherein

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combining the other partially overlapping images, which are projected onto an image surface of the standard image with respect to each of the other partially overlapping images, so that a composite image is generated on the image surface so as to correct
5 image distortions in the standard image.

10 7. An image processing apparatus for correcting image distortions caused by oblique imaging in which an original image of an object on an object plane is taken from different oblique directions to obtain a plurality of partially overlapping images, comprising:

15 a correspondence detecting unit determining a feature point of one of the plurality of partially overlapping images corresponding to a common location of the original image, shared by the plurality of partially overlapping images, and determining a matched point of one of the other partially overlapping images corresponding to the
20 feature point of said one of the plurality of partially overlapping images so that a direction of the object plane is calculated based on the feature point and the matched point;

a standard image setting unit selecting one of the plurality of partially overlapping images as a standard image that contains a

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smallest amount of image distortions among the plurality of partially overlapping images; and

an image composition unit combining the other partially overlapping images, which are projected onto an image surface of the standard image with respect to each of the other partially overlapping images, so that a composite image is generated on the image surface so as to correct image distortions in the standard image.

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8. The image processing apparatus according to claim 7, wherein said standard image setting unit is configured such that a user is required to select the standard image when taking the original image from one of the oblique directions, and wherein said image processing apparatus further comprises a notification unit which notifies the user that the standard image is currently taken.

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9. An image processing apparatus for correcting image distortions caused by oblique imaging in which an original image of an object on an object plane is taken from different oblique

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directions to obtain a plurality of partially overlapping images,
comprising:

5 a correspondence detecting unit determining a feature point of
one of the plurality of partially overlapping images corresponding to
a common location of the original image, shared by the plurality of
partially overlapping images, and determining a matched point of
one of the other partially overlapping images corresponding to the
feature point so that a direction of the object plane is calculated
based on the feature point and the matched point;

10 a standard image setting unit selecting one of the plurality of
partially overlapping images as a standard image whose image
distortions are to be corrected; and

15 a distortion correcting unit generating a distortion-corrected
image on a projection plane by projecting the standard image onto
the projection plane based on the direction of the object plane such
that image distortions in the standard image are eliminated.

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10. The image processing apparatus according to claim 9,
further comprising a plurality of imaging units which respectively
input the plurality of partially overlapping images that are generated
by taking the original image from the oblique directions.

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11. The image processing apparatus according to claim 9,
wherein said standard image setting unit is configured such that one
of the plurality of partially overlapping images is automatically
selected as the standard based on a ratio of an area of an object
5 region to an entire area of each image.

10 12. The image processing apparatus according to claim 9,
wherein said standard image setting unit is configured such that one
of the plurality of partially overlapping images is automatically
selected as the standard based on a direction of a straight-line
pattern contained in each image.

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13. The image processing apparatus according to claim 9,
20 wherein said standard image setting unit is configured such that one
of the plurality of partially overlapping images is automatically
selected as the standard based on the feature point and the matched
point determined by said correspondence detecting unit.

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14. The image processing apparatus according to claim 9,
wherein said standard image setting unit is configured such that one
of the plurality of partially overlapping images is automatically
selected as the standard image based on a calculated direction of the
5 object plane for each of the partially overlapping images.

10 15. A computer-readable storage medium storing program code
instructions for causing a computer to execute an image distortion
correction processing to correct image distortions caused by oblique
imaging in which an original image of an object on an object plane
is taken from different oblique directions to obtain a plurality of
15 partially overlapping images, comprising:

first program code means for causing the computer to
determine a feature point of one of the plurality of partially
overlapping images corresponding to a common location of the
original image, shared by the plurality of partially overlapping
20 images, and to determine a matched point of one of the other
partially overlapping images corresponding to the feature point so
that a direction of the object plane is calculated based on the feature
point and the matched point;

second program code means for causing the computer to select one of the plurality of partially overlapping images as a standard image whose image distortions are to be corrected; and

third program code means for causing the computer to
5 generate a distortion-corrected image on a projection plane by projecting the standard image onto the projection plane based on the direction of the object plane such that image distortions in the standard image are eliminated.

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16. A computer-readable storage medium storing program code instructions for causing a computer to execute an image distortion
15 correction processing to correct image distortions caused by oblique imaging in which an original image of an object on an object plane is taken from different oblique directions to obtain a plurality of partially overlapping images, comprising:

first program code means for causing the computer to
20 determine a feature point of one of the plurality of partially overlapping images corresponding to a common location of the original image, shared by the plurality of partially overlapping images, and to determine a matched point of one of the other partially overlapping images corresponding to the feature point of
25 said one of the plurality of partially overlapping images so that a

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direction of the object plane is calculated based on the feature point
and the matched point;

second program code means for causing the computer to select
one of the plurality of partially overlapping images as a standard
5 image that contains a smallest amount of image distortions among
the plurality of partially overlapping images; and

third program code means for causing the computer to combine
the other partially overlapping images, which are projected onto an
image surface of the standard image with respect to each of the other
10 partially overlapping images, so that a composite image is generated
on the image surface so as to correct image distortions in the
standard image.

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